

## License Fee Discounts

In their paper, "The Economics of License Fee Discounts,"<sup>42</sup> James Dertouzos and Steven S. Wildman (hereafter "DW") claim (1) that small cable operators, including new entrants, pay significantly higher prices for programming than do large incumbent cable operators; (2) that these rate differences are justified neither by "true cost differences nor legitimate business incentives"<sup>43</sup> and, therefore, (3) that the rate differences are a barrier to effective competition in the supply of multichannel video services.<sup>44</sup> However, the evidence and analysis presented by DW do not support these conclusions.

In particular, DW's estimates of the discount obtained by large cable MSOs are likely to be highly inaccurate and their attempt to ascribe virtually their entire estimated difference to bargaining power on the part of large MSOs is defective because they fail to recognize the large number of cost and efficiency-based explanations for any differences that actually exist.

## Program Service Prices

DW first attempt to quantify the differences between the fees paid by larger MSOs and those paid by smaller MVPDs. They then purport to show that differences in rates as large as those they have quantified could not be based on cost, but instead must primarily represent the exercise of bargaining power by the

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<sup>42</sup> Filed as Exhibit 4 to Comments of Ameritech, *In the Matter of Applications of AT&T Corporation, Transferee and MediaOne Group, Inc., Transferor ("MediaOne") For FCC Consent to Transfer of Control Pursuant to Sections 214 and 310(d) of the Communications Act, as Amended, of Licenses and Authorizations held by Subsidiaries of MediaOne and Entities Controlled by MediaOne*, CS Docket No. 99-251, August 23, 1999.

<sup>43</sup> DW, p. 14.

<sup>44</sup> DW never actually discuss the implications of their analysis for the AT&T-MediaOne merger.

larger MSOs. DW conclude that the result is to create a barrier to entry to new MVPDs.

There are problems with each stage of DW's argument. The authors' interpretation of the data on price differences and their analysis of the possible sources of differences in pricing are seriously flawed. Moreover, even to the extent that pricing patterns may reflect the bargaining power of large operators, this is unlikely to create a barrier to increased competition in multichannel video distribution.

#### The Magnitude and Sources of Program Pricing Differences

DW claim to have presented information on the magnitude of programming price discounts provided to large MSOs and then to have shown, by process of elimination, that such differences cannot be attributed to sources other than the bargaining power of such large MSOs. The fundamental problems with DW's analysis are: (1) their measures of the differences in the rates actually paid by larger and smaller MSOs are highly questionable; and (2) the authors fail to consider a wide variety of other reasons, including cost and efficiency-based reasons, for the calculated rate differences.

#### *Reported Rate Card Discounts*

DW first provide a summary of information from the rate cards for twelve cable networks. For each of these networks, DW report the number of subscribers required to qualify for the maximum discount, the magnitude of the maximum

discount, and the length of the contract.<sup>45</sup> However, it is very doubtful that these data are reliable estimates or indicators of cost disadvantages faced by an entrant.

First, rate card fees may differ substantially from the fees negotiated and actually paid by MSOs. Many MSOs — not only the very largest — pay negotiated fees that differ from rate card fees.<sup>46</sup> Indeed, DW never actually claim that the rate card rates are being paid by anyone.<sup>47</sup> If entrants and small MVPDs can negotiate rates that are lower than those in the rate cards employed in their calculations, DW's estimate of the cost disadvantage faced by an entrant (or a small cable operator) could be overstated.

Second, DW's calculations are based on the rate cards for only twelve networks, and there is no way of knowing how representative this sample is because these networks are not identified.<sup>48</sup> Indeed, even among the networks for which DW do provide information, there are substantial differences with respect to both the magnitude of the maximum discounts offered and the number of subscribers required to qualify for those discounts.

Third, the magnitude of the maximum discount and the numbers of subscribers required to qualify for some discounts — and in some cases for the maximum discount — can be quite modest. Rate cards for two of the networks are reported to offer maximum discounts of only 2.7 and 7.4%. One network offers a

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<sup>45</sup> DW, Table 1, p. 6.

<sup>46</sup> DW (p. 5) state that “smaller MVPDs apparently have little choice but to pay the card rates” but they provide no evidence that this is the case. At another point (p. 10), they claim that “small MVPDs receive either small or no discounts.”

<sup>47</sup> DW refer (p. 5) to “contracts” between networks and MVPDs but their analysis is based entirely on rate cards and not on any actual agreements.

<sup>48</sup> DW, p. 5, footnote 4 indicates that the authors cannot identify these networks.

discount to an MVPD with only 1,000 subscribers, one offers discounts to MVPDs with 50,000 subscribers, and four offer discounts to an MVPD with only 100,000 subscribers.<sup>49</sup> These are very modest numbers of subscribers for an entrant to reach, particularly an entrant seeking to compete in metropolitan areas. Indeed, no fewer than 51 cable MSOs would qualify for discounts on those four networks that require a minimum of 100,000 subscribers.<sup>50</sup> For six networks, even the maximum discount is available to an MVPD that reaches as few as 2% of all MVPD subscribers.

#### *Comparison of Top of the Rate Card Rates and Average Fees*

DW recognize that rate cards may not reflect actual fees paid by distributors for programming, so they present alternative calculations based on data for basic cable networks reported by Paul Kagan Associates, which the authors claim are “more realistic” estimates of the cost disadvantage faced by entrants. For each of 33 basic cable networks, DW report the difference between the “top of the rate card” fee for 1997 and the reported average license fee paid in 1997. DW then examine whether distribution and transaction cost savings or other efficiencies can explain the observed differences. They conclude that these differences cannot be ascribed to the greater efficiencies of transactions with large MSOs and that, therefore, they are due to the greater bargaining power of large cable operators. Both the evidence presented and the explanations offered are, however, unsatisfactory.

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<sup>49</sup> Many of these are among the networks reported to offer large discounts.

<sup>50</sup> Kagan's *Cable TV Investor*, “Top-100 Cable System Operators, as of September 1998,” No. 536, March 3, 1999, lists 51 MSOs with more than 100,000 subscribers.

First, DW fail to consider that the top of the rate card fee and the average fee do not represent fees offered or paid at the same point in time. DW compare the top of the rate card rate *in* 1997 with the reported average rate paid by MVPDs *during* 1997. However, the average rate is based on contracts, many of which were entered into in years prior to 1997. Because rates for most services have been rising,<sup>51</sup> and because program service contracts extend over several years, the average rate paid in any year (other things equal) will be below the top of the rate card rate in that year *even if there were no discounts*.<sup>52</sup>

Second, when DW translate their estimated discounts into a dollar cost disadvantage for an entrant, they assume that an MSO with 100,000 subscribers pays the top rate.<sup>53</sup> However, that assumption is incorrect for six of the twelve services for which rate card information is provided by DW, and may be incorrect for other services as well.

Third, the fees paid by cable operators and other MVPDs depend on a wide range of provisions in their contracts with program services. Terms that can have substantial effects on the fees actually paid, other than number of subscribers, include length of contract, tier and channel position commitments, limitations on removing the service from the operator's channel lineup, rollout commitments, amount and type of promotional or advertising services provided by a distributor,

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<sup>51</sup> The top of the rate card rates for 5 of the 23 services examined by DW that were in existence in 1992 increased by at least 100%, the rates for 10 of these services increased by at least 50%, and the rates for 18 of these services increased by at least 25% between 1992 and 1997.

<sup>52</sup> Technically, the moving average of an increasing series will always be lower than the last term in that series. A similar problem infects DW's comparison (p. 13) between the programming costs of Time Warner for 1997-1998 and the programming costs of Ameritech New Media for the last quarter of 1998 and the first quarter of 1999.

<sup>53</sup> DW, p. 8.

whether the program is purchased separately or as part of a package, timing of payments, date of purchase (particularly purchase at launch), and penetration guarantees. Without taking these, and other, differences into account, it simply is not possible to compare the prices paid by different operators, but DW's analysis neither recognizes nor controls for these differences.

In this regard, DW's argument that the benefits to a program service from carriage commitments, channel positioning, and the like affect both large and small cable operators, so that they cannot explain the rate disparities DW measure, is misplaced. Because the disparities are measured from the top of the rate card, if both large and small operators negotiate lower rates because, for example, they both provide subscriber guarantees, *neither* will pay the top of the rate card rate, and comparisons with the top of the rate card rate will not accurately measure any disadvantage faced by small operators. More generally, the rate comparisons undertaken by DW become increasingly irrelevant as these additional factors are taken into account because the top of the rate card rates apply to fewer and fewer operators.

Fourth, DW attempt to calculate the negotiations costs that are "implicit" in the Kagan data. When they do so, they find that these estimates are implausibly high.<sup>54</sup> However, DW's calculation assumes that transaction cost efficiencies must explain the *entire* estimated discount.<sup>55</sup> By omitting all other possible explanations,

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<sup>54</sup> DW perform this calculation for only 18 of the 33 networks for which they have data, but do not explain why they limit their calculation in this manner.

<sup>55</sup> DW, p. 16, footnote 22, the authors' calculation is based on the assumption that their estimate of the implicit transaction cost difference "is due *entirely*" (emphasis added) to the difference in the number of subscribers served by two systems.

such as those described above, it is hardly surprising that they obtain an implausibly high estimate.

In addition, it should be observed that DW's estimate of the size of transaction costs that would completely explain the estimated rate differences is highly sensitive to their use of 100,000 subscribers to characterize small MVPDs. Many MVPDs serve very few subscribers, and DW would have obtained far lower "breakeven" transaction cost estimates if they had employed a subscriber estimate that was more typical of small operators who, arguably, pay the top of the rate card rate. For any given estimated price difference, the breakeven transaction cost estimates fall with reductions in the number of subscribers served by the small MVPD. For example, DW's estimates would have been approximately one-tenth as large if they had performed their calculations assuming that small MVPDs had 10,000 instead of 100,000 subscribers.<sup>56</sup>

#### Why Quantity Discounts Are Efficient

There are many possible reasons for charging lower fees to larger MSOs that are consistent with efficient market outcomes.<sup>57</sup> Indeed, the FCC has recognized that a variety of legitimate cost and non-cost reasons can justify why fees vary.

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<sup>56</sup> When the comparison is to very large systems, the estimated breakeven transaction cost is approximately equal to the rate difference multiplied by the size of the small system to which it is being compared. Thus, the estimate is roughly proportional to the size of the smaller system.

<sup>57</sup> For a more complete discussion, see S.M. Besen, S.R. Brenner, and J.R. Woodbury, "Exclusivity and Differential Pricing for Cable Program Services," January 25, 1993. There we observed (p. 11) that "Economies in selling and transaction costs provide one reason why it would be efficient for different distributors to pay different per-subscriber fees for the same program service. This, however, is only one of many possible reasons why such pricing differences might exist and be efficient."

Program services sell advertising time, and the value to advertisers of the audience a network can deliver often will increase more than proportionately with the size of the audience. Larger MSOs deliver a greater increase in a network's national "reach" than do smaller MSOs. Such increases in national reach or penetration increase the value of carriage to a program service. As program services compete for carriage by larger MSOs, they will be willing to pay for this more valuable carriage by offering lower fees per subscriber. Thus, DW are not correct when they claim that "national advertising cannot be a reason for networks to offer larger discounts to the biggest MSOs."<sup>58</sup>

Larger MSOs may undertake more promotional activity on behalf of the program services they carry, either because they are more likely to be able to insert the local, cross-promotional messages in their own programming, or because advertising in other media is more efficient due to greater concentration of subscribers. Larger MSOs may also engage in more promotion because they capture a larger proportion of the additional subscribers that the promotional activity makes possible.<sup>59</sup>

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<sup>58</sup> DW, p. 23.

<sup>59</sup> DW's arguments as to why program services would not make payments in the form of lower license fees to large MSOs that are more efficient at promotion are poorly founded. First, they argue (p. 21) that these promotional activities create no value because "audience share for one network must come at the expense of viewing for other networks." However, viewing can also come at the expense of broadcast television, so that cable networks are not competing for a fixed audience. Second, even if the cable viewing share were fixed, each network would want to have its programming promoted lest it lose shares to other networks that are promoted by the operator. Third, because of the nonlinearity in the advertising revenue-audience relationship, advertising revenues increase more than in proportion to viewership increases (which are presumably correlated with subscribership increases). Finally, whether or not new subscribers are "fundamentally different from old subscribers" (p. 21) is irrelevant to the issue of whether networks will wish to create incentives for MSOs to promote their programming. It is also unclear why DW believe (p. 21) that the competitive response to some networks reducing their license fees to large MSOs is that other networks would *raise* their fees.



Carriage commitments by large MSOs may be particularly important when a service is first introduced. Large MSOs may provide a screening function by their decision to carry a new service. That decision by larger MSOs, which expend more resources to evaluate the likely success of a service, signals to other distributors that the service is worth carrying.<sup>60</sup> This makes carriage by a large MSO attractive to the networks, and they are often prepared to offer lower fees at startup for MSOs that agree to carry the service. Those lower fees seem to persist to some extent over time, perhaps in recognition of the fact that the MSOs cannot be fully compensated for the *ex ante* risk of carrying an unproven network within the timeframe of a single contract, while still paying fees high enough to cover the cash flow requirements of a new network. Thus, DW are not correct when they claim that “contractual terms such as channel removal restrictions and rollout commitments ... [cannot] justify the tremendous price differentials between large MSOs and small MVPDs.”<sup>61</sup>

Because there are many legitimate reasons for differences in rates — for example, differences in contract timing, in contract terms, and in the value to the programmer of carriage and services performed by the MSO — there is no support for DW’s conclusion that the estimated differences are due primarily to bargaining power.

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<sup>60</sup> DW claim (p. 21) that “If large MSOs’ choices of networks to carry are biased by otherwise unexplainable low license fees, then their choices can no longer be considered reliable indicators of network quality” confuses cause and effect. Large MSOs have no incentive to carry networks that their subscribers will not like and must, therefore, invest in evaluating service offerings. Because small operators can rely on choices made by larger ones, program services are willing to compensate large MSOs for the screening function they perform and the costs they incur in doing so.

<sup>61</sup> DW, p. 22.

### Implications of Differences in Fees among Distributors

DW claim that: "one cannot help but conclude that the substantial discounts offered to large incumbents are not cost-justified and, therefore, constitute a barrier to competition in the MVPD industry."<sup>62</sup> In making this claim, however, DW fail to address two basic points. First, as observed in our monopsony discussion, bargaining power in negotiations between two parties can affect the division of the gains that the parties realize from an agreement without affecting the efficiency with which resources are utilized. Thus, there is a basic distinction between *bargaining power*, which affects the distribution of the gains from a transaction, and *market power*, which affects the allocation of resources. As Dr. Wildman himself noted in an analysis (co-authored with Bruce Owen) of bargaining power that large MSOs may possess:

Bargaining power is not the same as market power. Market power results in reduced output. Bargaining power merely shifts profits between seller and buyer. There is no basis for policy concern with bargaining power when it does not reduce output...there is little basis for concern that the buying power of MSOs significantly lessens competition.<sup>63</sup>

Second, consumers can and do benefit from the exercise of bargaining power. Economic theory indicates that if bargaining power has the effect of reducing per-subscriber program fees, at least a portion of lower input prices will be passed on to consumers, and this apparently occurs here. As evidence previously

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<sup>62</sup> *Id.*, p. 3.

<sup>63</sup> B.M. Owen and S.S. Wildman, *Video Economics* (Cambridge, MA: Harvard University Press, 1992), pp. 244-245.

presented by DW clearly shows,<sup>64</sup> large cable operators not only charge lower prices but they also offer more services than do small operators. In this regard, Waterman concludes that there are “opposing forces as a retailer coalition becomes larger — increasing power to exert monopsony power, *but decreasing incentives to do so....*”<sup>65</sup> Aggressive bargaining by a small cable operator may not have noticeable effects on the number or quality of program services available, but the same aggressive bargaining by larger MSOs may result in a decline in the number or quality of program services. If such a decline were to reduce the profitability of the larger MSOs by reducing the number or quality of the program services available to them, large MSOs would bargain less aggressively than small ones.

Similarly, as Owen and Wildman observe in their analysis:

A large MSO would notice that its action in paying too little for programs in hundreds of individual systems was having the effect of reducing the supply of programming, resulting in lower profits. The MSO, precisely because of its recognition of its own buying power, would find it profitable to act to expand the supply of programs. If the reduction in supply caused by the problem of local monopsony power were very substantial, the MSO's decision about its purchases would bring output closer to the efficient level than if no MSOs were permitted. In this case MSOs would have monopsony power, but it would be exercised in a benign way, making consumers better off than they would be if thousands of individual systems exercised buying power.<sup>66</sup>

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<sup>64</sup> “Programming Access and Effective Competition in Cable Television,” filed in MM Docket No. 92-264/CS Docket No. 98-82 as Attachment 2 to the Comments of Ameritech New Media, Inc., August 14, 1998.

<sup>65</sup> D. Waterman, “Local monopsony and free riders,” *Information Economics and Policy*, Vol. 8, No. 4 (December 1996), p. 341, emphasis added.

<sup>66</sup> Owen and Wildman, p. 243.

Even if, or to the extent that, fees for program services are affected by bargaining power between distributors and services, it does not follow that the exercise of such bargaining power harms consumers. Indeed, if anything, the evidence previously presented by DW indicates that consumers benefit when large cable operators exercise bargaining power in their dealings with program services.<sup>67</sup>

### **The Issue of Vertical Foreclosure**

For two reasons already considered in our discussion of monopsony, we believe that it is unlikely that the combined AT&T-MediaOne would have either the ability or the incentive to reduce the quality of the services carried by its cable systems. First, AT&T will not be able to exercise monopsony power because of competition from other buyers, such as broadcast television stations and networks, and by the increasing importance of DBS. Second, even to the extent that AT&T may possess some monopsony power, it is likely to be able to exercise it without an adverse effect on program quality. Indeed, we explained above why large cable operators such as AT&T will be especially concerned about the effect of their behavior on program quality because their purchase decisions are likely to have disproportionate effects and, thus, they will be unable to “free ride” on the purchase decisions of smaller system operators.

Nonetheless, both Professor Hausman and the CFA have argued that the combined entity will have increased ability to disadvantage rival program services

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<sup>67</sup> J.N. Dertouzos and S.S. Wildman report in “Programming Access and Effective Competition in Cable Television,” that “TCI and Time Warner carry more network programming of all types than do other cable system operators” (p. 19).

and that it will have an incentive to reduce the competition faced by their vertically integrated services. For example, Hausman contends that “the vertically integrated company pays a lower price for programming it buys from third parties and is able to charge a higher price for its programming because of the lower quality of the competing programming.”<sup>68</sup> CFA implies that the merged entity would have increased incentives to foreclose competing services by limiting their distribution on AT&T cable systems.<sup>69</sup> These filings suggest that vertically integrated cable operators in general, and the merged entity in particular, have an additional incentive to adversely affect the quality of program services and that, somehow, this situation will be worsened by the proposed merger.

We begin this section by describing briefly the results of a number of empirical analyses of the effects of vertical integration on the carriage of cable program services. The basic conclusions from this survey are that vertically integrated cable operators do *not* disfavor non-pay program services in which they do not have ownership interests, and that the implied magnitude of any foreclosure effect of pay services is too small to be ascribed to an effort to disadvantage rival program services.

We then explain why this evidence is consistent with the fact that even large, vertically integrated cable MSOs are unable to substantially disadvantage rival program services, or that countervailing factors more than offset any incentives that large MSOs might have to disadvantage rival services, or both. Finally, we

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<sup>68</sup> Hausman Declaration, p. 12.

<sup>69</sup> *Breaking the Rules*, p. 29.

emphasize the efficiencies that arise from the integration of large MSOs and cable program services, efficiencies that would be lost if unnecessarily stringent limits were placed on the size of MSOs.

### Empirical Evidence on Vertical Foreclosure

This section briefly describes the empirical evidence as to whether vertically integrated systems “favor” program services in which they have ownership interests and “foreclose” program services that compete with the services they own. The description is based on evidence from the public literature, including published papers, articles, and studies performed for regulatory proceedings, as well as the results of our own analyses of differences in carriage rates between TCI-owned systems and unaffiliated systems.<sup>70</sup>

The bulk of the empirical evidence indicates that vertically integrated cable operators do *not* disfavor non-pay program services in which they do not have ownership interests. In particular, carriage rates for these services by vertically integrated systems are generally not lower than those of systems that are not vertically integrated. Moreover, even where carriage rates by vertically integrated operators are found to be lower, the differences are generally small when compared either to the universe of cable subscribers or to the total number of subscribers with access to the service.

Similarly, there is little or no evidence of the foreclosure of pay services.

While most studies find that cable systems that are integrated with pay services

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<sup>70</sup> Appendix D provides a brief survey of the empirical investigation of carriage behavior by vertically integrated systems.

tend to carry rival pay services less frequently than do unintegrated systems, the magnitude of the extent to which disadvantaged rivals are denied access to the subscriber universe is quite small.

More generally, even where there are *statistically* significant differences in carriage rates, these differences are unimportant *economically*. That is, even in those studies that find a statistical relationship between vertical integration and cable carriage, the implied magnitude of any “foreclosure” effect is too small to be ascribed to an effort to disadvantage rival program services.

A number of studies have specifically examined TCI’s carriage behavior. One study (by Robert Crandall)<sup>71</sup> found that TCI systems were significantly more likely to carry both affiliated and unaffiliated program services than were systems that were not affiliated with any service, indicating no evidence of discrimination against unaffiliated services. Using more recent data, we found that TCI had higher carriage rates than cable systems without programming interests for 13 of 19 affiliated program services, but that it also had higher carriage rates for 25 of 46 unaffiliated services.<sup>72</sup> Importantly, the differences in carriage rates between TCI and other operators were generally quite small. Overall, we found that the net “foreclosure” rate for unaffiliated services was less than one-half of 1% of all subscriber transactions, an amount that is clearly too small to attribute to a systematic foreclosure strategy.

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<sup>71</sup> “Vertical Integration and q-Ratios in the Cable Industry,” mimeo, 1990.

<sup>72</sup> When we compared TCI carriage rates with those of non-TCI systems without controlling for other differences among systems, we found that, relative to its owned program services, TCI *favors* unaffiliated services. Moreover, we found no significant relationship between TCI’s carriage behavior and the magnitude of its ownership interest in a program service.

In addition to evidence on the carriage of individual services, some studies consider the effect of vertical integration on the number of services offered, price, and subscribership. The limited evidence suggests that operators that are integrated with pay services carry somewhat fewer pay services (between .5 services and 1 service) than do other operators. The evidence of the effect of vertical integration on pay prices and subscribership appears less conclusive but suggests that prices are lower and subscribership is higher in systems that are vertically integrated with pay services.

For non-pay services, the evidence is generally consistent with the conclusion that vertical integration increases the number of services offered. In addition, the results suggest that vertical integration between cable systems and non-basic cable services is associated with lower non-pay service prices and higher non-pay penetration.

Finally, evidence on the survivability of program services that are not integrated with cable operators provides many instances of services that, while not vertically integrated, have existed for a very long period of time. Indeed, some of these are among the most successful program services.

These findings, which are consistent with the theoretical analysis presented above, are similar to those offered in another recent review of antitrust policy towards vertical integration in the cable industry:

There is no empirical basis for concluding that vertical integration or mergers [in the cable industry] are, on balance, anticompetitive. Thus, in this case, there does not appear to be an empirical



economic basis for challenging vertical mergers or seeking or accepting sweeping consents.<sup>73</sup>

### Why Vertical Foreclosure Is Unlikely Here

The concern that vertical integration may reduce competition and efficiency by restricting the supply of programming is based on the belief that a large MSO such as AT&T may be able to disadvantage a program service that is an actual or potential rival of a program service with which it is affiliated. The most overt form of such behavior would be refusal to carry the rival program service. In this scenario, because its rival is disadvantaged, the program service affiliated with AT&T is now able to raise its price to other cable operators, thereby increasing its profits.

However, in analyzing the question of whether post-merger, AT&T would engage in vertical foreclosure, Hausman and CFA fail to demonstrate that the set of limited circumstances in which such anticompetitive behavior would be profitable is applicable to this merger. There are two basic reasons why this is so. First, AT&T will not have the ability to engage in the strategy. Second, even if it has the ability, AT&T will not have an incentive to engage in the strategy.

### *Hausman and CFA Fail to Demonstrate That AT&T Has the Ability to Foreclose a Rival Service*

Hausman and CFA do not consider the possibility that a refusal by AT&T to carry a rival program service may not make the rival less effective. This is so for a variety of interrelated reasons: for many services AT&T may not be large enough for its carriage decisions to have a significant effect on the quality of the

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<sup>73</sup> Michael W. Klass and Michael A. Salinger, "Do new theories of vertical foreclosure provide sound guidance for consent agreements in vertical merger cases?," *The Antitrust Bulletin* (Fall 1995), Vol. XL, No. 3, p. 692.

programming. In this regard, it is especially important to measure the size of an MSO correctly. The ability to foreclose will depend in part on the number of subscribers for which the MSO purchases, or influences the purchases of, programming. Thus, although AT&T has ownership interests in cable systems that serve a large number of subscribers, it purchases programming for systems that serve a much smaller number – about 25 percent of MVPD subscribers after the merger.

Moreover, in terms of the magnitude of the financial interest or the degree of control conveyed, AT&T's ownership interests in other systems are unlikely to enable it to significantly influence the programming choices of many of those systems (if at all). Neither Hausman nor CFA have shown that AT&T can use its fractional, minority interests in other cable systems to influence the programs they carry. In addition, the service may be profitable enough to absorb the loss of revenue; the service may be able to adjust its cost; and, given these factors, AT&T may not be large enough to impose sufficient harm to disadvantage the rival. In other words, even if AT&T could foreclose a quarter of all MVPD subscribers to a program service, Hausman and CFA provide no evidence that this would have a material impact on the programmer's costs.

Moreover, the effectiveness of a foreclosure strategy is further weakened if other distributors can carry a rival service that AT&T tried to foreclose. In light of developments that have occurred since the passage of the 1992 Cable Act and the adoption by the Commission of rules limiting the size of MSOs — especially the rapid growth in the number of subscribers served by DBS operators — this factor places an

especially important constraint on the ability of a large, vertically integrated MSO such as AT&T to foreclose a rival program service. Non-cable MVPDs currently account for approximately 16% of all MVPD subscribers, a share that will grow substantially because of rapid DBS growth. Finally, regulations such as the Commission's channel occupancy rules substantially limit AT&T's ability to implement FCC foreclosure strategy. This is because a large portion of AT&T's channel capacity must be set aside for the carriage of programming in which it has no ownership interest.

*Hausman and CFA Fail to Demonstrate That AT&T Has an Incentive to Foreclose a Rival Service*

The ability of an MSO like AT&T to disadvantage rival program services is necessary for the foreclosure strategy discussed here to succeed, but it is not sufficient. Hausman and CFA fail to address the substantial reasons why post-merger, AT&T would lack the incentive to adopt such a strategy. First, the foreclosure strategy could well be too costly for AT&T to pursue. If AT&T were to choose not to carry a program service that rivals its own (or to otherwise make it more difficult for subscribers to obtain access to the rival service), and the rival is valued by AT&T's subscribers, some subscribers would choose to terminate their cable service at the current price because the service is no longer attractive to them. Alternatively, subscribers could reduce their willingness to pay for cable service, thus reducing the price AT&T could charge. Moreover, the growth of the DBS alternative is likely to have increased subscriber responsiveness to a failure of AT&T to carry their preferred lineup of program services. Because of the relatively large difference between incremental subscriber revenues and costs experienced by cable systems (required

by the high fixed costs associated with the cable system plant), even a loss of a small number of subscribers can render unprofitable a foreclosure strategy by AT&T.

In addition, cable operators generally, and AT&T in particular, tend to share ownership of program services with other investors. If AT&T disadvantaged a rival so that its affiliated service could raise its price, AT&T would also be paying a higher price because it has only a partial ownership interest in the service. If its financial interest in the program service is relatively small, the additional program service costs could easily outweigh its share of additional profits. In the case of AT&T, it has only small interests in many services, so that this consideration is especially important.<sup>74</sup>

Moreover, many of the services that are legally owned by AT&T are held through Liberty for which the economic benefits accrue to the owners of a separate tracking stock. Under the tracking stock arrangement, AT&T shareholders would receive no economic benefits if AT&T cable systems were to foreclose rivals to Liberty program services. In addition, the ownership interests that AT&T will obtain through the MediaOne acquisition are also fractional. Thus, while AT&T would bear the substantial costs of a foreclosure strategy, it would obtain only a small fraction of the potential "benefits."

Equally important, eliminating one or a few rival program services may have little or no effect on the amount that other cable systems would be willing to pay for the program service owned by the foreclosing MSO. The program service owned by an

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<sup>74</sup> As one example, AT&T has only an approximate 9% interest in the Turner services. As noted above, this interest is held through Liberty.

MSO may be only one of many existing or potential program services that are relatively close substitutes.<sup>75</sup> These services, which need not carry the same type of programming, appeal to the same audiences, or even charge similar license fees, are substitutes so long as carrying any of them yields approximately the same incremental net revenue. In such cases, adding any one of these to a tier of services earns a cable system approximately the same increment in net revenues, so that disadvantaging one or a few of these services would have little effect on the amount the cable system would pay for the service owned by the MSO. Only by eliminating a large number of these rival services, including potential entrants, could this strategy raise the profits of the MSO's program service, but this would also increase the cost of the strategy.

Moreover, AT&T may very well be too large, as well as too small, for a strategy of disadvantaging rival program services to be attractive. Increasing the share of all subscribers served by the foreclosing MSO also increases the losses it must bear. This factor becomes increasingly important as AT&T becomes larger. Moreover, as AT&T grows larger, even large price increases for the affiliated service may not substantially increase its incentive to foreclose because of the increased subscriber losses experienced by its cable systems.

In addition, increasing the number of subscribers served by AT&T reduces the benefits realized through the program service it owns. The program service earns increased revenue because elimination of the rival allows it to charge other

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<sup>75</sup> We reported above on the fact that the proposed merger has relatively little effect on concentration among cable program services.

cable systems a higher license fee. But this is a gain only when those cable systems are not owned by AT&T.<sup>76</sup> Thus, increasing the number of subscribers served by AT&T *reduces* the likelihood that the gains from foreclosure will outweigh the costs.

### Counterstrategies to Prevent Foreclosure

Although effecting a profitable foreclosure strategy is by no means easy, there is an additional hurdle that must be surmounted. Cable systems and other non-cable MVPDs that would be disadvantaged if a rival program service were foreclosed by AT&T have an incentive to attempt to keep the rival in business by adopting counterstrategies to the attempt to foreclose.<sup>77</sup> These counterstrategies make the exercise of foreclosure power even more unlikely.

A foreclosure strategy that appears profitable rests on the ability of the MSO to disadvantage a rival program service, perhaps to the point that it goes out of business. If it goes out of business, the profits earned by cable systems in other markets may be reduced.<sup>78</sup> This loss in profits, however, may be greater than the additional amount necessary for the rival program service to stay in business. In such cases, there is the potential for payments to be made from the disadvantaged MVPDs to the disadvantaged program service that will prevent it from going out of business.<sup>79</sup>

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<sup>76</sup>With elimination of the rival service, the license fees paid by an MSO to a program service it owns might increase, but this is an intrafirm transfer that adds nothing to the profitability of foreclosure.

<sup>77</sup> See F.H. Easterbrook, "Predatory Strategies and Counterstrategies," *University of Chicago Law Review* 48 (1981): pp. 263-337.

<sup>78</sup> This will depend on the substitutability among program services.

<sup>79</sup> Note that the necessary payments may be smaller than the loss in revenues experienced in the market of the vertically integrated MSO.

Moreover, a successful counterstrategy might not require the cooperation of all disadvantaged MVPDs. There may be instances in which many cable operators realize that the success of the program service depends on each making an appropriate contribution. Still another possibility is that a number of MVPDs may vertically integrate with an otherwise disadvantaged program service. Finally, the program service may solicit increased payments from MVPDs that are contingent on receiving similar payments from other MVPDs.<sup>80</sup>

Faced with the likelihood of an effective counterstrategy, an MSO such as AT&T would decline to pursue the foreclosure strategy. In these instances, there are no benefits from pursuing the strategy, and costs must be incurred in the MSO's own markets when it does not carry the rival program service.<sup>81</sup>

#### Foreclosure vs. Efficiency

We concluded in our earlier analysis that the likelihood of vertical foreclosure is quite remote. In addition, there are a number of well-known efficiency benefits from vertical integration. Vertical integration can eliminate the distortion created by "double marginalization," i.e., the successive mark-ups over marginal cost that occur when a programmer and cable operator make pricing decisions without accounting for the effects of their decisions on the profits of the other. For example, when a cable operator with programming interests raises a program service price, it is concerned with how the price increase affects its own profits, not the profits of the cable operators that buy its service. This causes the operator to charge a higher

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<sup>80</sup> There would appear to be no legal impediments to solicitations of this form.

<sup>81</sup> The effect on competition will depend on the form of the additional payments that are made by cable operators to the rival service. If these payments affect only infra-marginal subscribers, there is no effect.

program service price than it would if it owned the other cable operators. Similarly, when setting the price of cable service, an unintegrated cable operator will ignore the fact that a higher subscriber price reduces the demand for the program service and therefore reduces the program service's profits. All else equal, this causes the cable operator to charge a higher price than it would if it owned one or more program services.<sup>82</sup>

Once the vertically integrated cable operator acquires an unintegrated operator, the pricing incentives change. The vertically integrated owner will take into account the combined profits of the program service and the newly acquired systems in setting the price of the program service. In particular, the operator will "charge" the newly acquired system the marginal cost of program distribution, thereby eliminating one of the two margins.<sup>83</sup> The acquired cable system will then lower the price it charges to cable subscribers, reflecting the lower programming cost. The more systems that are owned by the vertically integrated cable operator, the greater the benefits from the elimination of double marginalization.

In addition to eliminating the distortions created as a result of double marginalization, the acquisition of one cable system by another can increase expenditure on demand or quality-enhancing activities. For example, suppose that the most efficient promoter of a program service in a local area is the local cable

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<sup>82</sup> In principle, double marginalization could be eliminated contractually if the programmer sold the service for a fixed dollar amount plus a per-subscriber charge equal to the marginal cost of serving an additional subscriber. We understand that these kinds of contracts are rarely executed in practice, suggesting that the costs of reaching an agreement with each cable operator on the appropriate fixed dollar amount may be substantial.

<sup>83</sup> We put "charge" in quotation marks because the accounting charge may differ from the amount that the operator uses in setting cable service prices.



operator. If the cable operator incurs the costs of promotion, it will increase the demand for the program service, generating more subscribers and/or permitting the operator to raise the price of the service. However, the cable operator may underinvest in promotion because it bears all of the cost but captures only part of the benefits (some of which will accrue to the program service). Similarly, the promotion may also enhance the value of the service on distribution outlets other than cable, or the promotional effects may extend beyond the local area. Because the cable operator will not share in these benefits, it will engage in less promotion than would be desired by the programmer. More generally, as long as the program price exceeds its marginal cost, the operator will underinvest in activities that enhance the value of the programming because the operator does not reap all of the benefits of its actions.

In this case, the programmer could, in principle, contractually agree to reimburse the cable operator for its promotional expenses. Two problems arise in doing so, however. First, the cable operator may incur excessive promotional expenditures because it is no longer bearing the costs of promotion. Second, the cable operator may attempt to reclassify some of its costs so that they qualify for reimbursement. As a result, the programmer may have to monitor closely the behavior of the operator by (for example) playing a significant role in designing and implementing the promotional strategy. The need to incur what could be substantial monitoring costs could make programmer participation unprofitable and result in a failure to undertake the promotional effort at efficient levels.

By contrast, if the cable operator were to acquire the program service, the operator would capture all of the profits that the service earned as a result of its efforts. Thus, it would have a stronger incentive to engage in the promotion. These promotional benefits increase as the number of systems owned by the vertically integrated cable operator increases.

There are other examples that illustrate the same point. Some promotional expenditures may most efficiently be borne by the programmer. Similarly, the programmer may be able to invest in improving the quality of its service. However, such investments may also increase the value of the cable systems on which the program services are offered. Because the programmer is unlikely to be able to capture all of those additional profits, the programmer will invest less in promotion or quality than it would if it could capture all of those gains.

As another example, by virtue of its daily contact with cable subscribers, a cable operator may be able to acquire information less expensively than can a programmer about subscriber preferences that would increase the attractiveness of a particular program service. The cable operator cannot capture all of the gains from this information through increased subscribership, or higher prices, on its systems because the service is now more valuable when sold to other cable systems as well. Consequently, a cable operator may not be willing to invest in acquiring the information and, as a result, some program services may never be developed.

In each of these cases, the ownership of the input suppliers by the cable operator would encourage investments and promotions that benefit cable

subscribers. In making its investment and promotional decisions, the owner of the combined entity will fully account for the profit-increasing effects that the cable system action has on input supplier profits and that the input supplier action has on cable system profits. Significantly, the magnitude of these benefits increases with the size of the cable operator. Indeed, the largest cable operators, including TCI, which is now owned by AT&T, have been important factors in both the development and success of many of the major program services. For example, we understand that TCI and Time Warner, among other MSOs, provided financial assistance to the Turner Broadcasting System (owner of CNN and superstation WTBS) at a time of financial distress for Turner.

This is not surprising. Large operators such as AT&T are willing and able to take the risk of promoting new services because they will obtain a large share of the resulting benefits if these services are successful. Because many of the costs of development are independent of the number of subscribers served, smaller operators will often be unable to economically incur the costs of such development. They are more likely to attempt to “free ride” on the development efforts of larger operators in the expectation that they will be able to carry services that succeed without incurring the development costs of those services that fail.

### **Summary and Conclusion**

We conclude that the claims made by economists retained by opposing parties are conceptually flawed, empirically unimportant, or both. First, the opposing economists have asserted that the merger will dramatically increase

concentration in the supply of program services to MVPDs. However, this assertion is largely driven by an assumption that the AT&T-MediaOne merger is accompanied by a complete merger between AT&T, Cablevision and Time Warner. However, once the fact that AT&T will have only a partial ownership interest in Time Warner after the merger is taken into account, the merger-related change in concentration is a fraction of that calculated by these economists. For this reason, and because of the apparent ease of entry into the provision of program services, we conclude that the merger will not adversely affect competition in the supply of program services to MVPDs.

Second, the opposing economists assert that DBS and other wireless providers impose no competitive constraint on the behavior of cable systems. Thus, these economists conclude that DBS can safely be ignored when evaluating the competitive effects of the merger. In fact, both the FCC and the Justice Department view DBS as a significant rival to cable systems. Moreover, because DBS's subscribership is growing so rapidly, the current share of MVPDs accounted for by DBS substantially understates DBS's competitive significance. This additional competition benefits not only subscribers but also program services in their dealings with large MSOs.

Third, the opposing economists claim that the merger will permit AT&T to exercise monopsony power in the purchase of program services, and that this will adversely affect the quantity and quality of programming that is available to MVPD subscribers. However, there are significant constraints on AT&T's bargaining power, including constraints imposed by the growing competitive importance of

DBS. Further, even in the unlikely event that such power could be exercised, there would likely be little or no effect on the amount or quality of programming.

Fourth, the opposing economists assert that large MSOs pay much lower prices for programming than do smaller MVPDs and that this adversely affects competition among MVPDs. However, the evidence for the size of the price disparities is highly suspect. Moreover, there are significant efficiency reasons for such differences to exist, and it is incorrect to attribute them entirely to the bargaining power of large MSOs.

Fifth, the opposing economists assert that the AT&T-MediaOne merger will increase AT&T's incentive and ability to foreclose rival program services. We observe, however, that the evidence on the carriage behavior of large cable MSOs does not reveal a consistent pattern of empirically important foreclosure of rival program services. We also note that many factors make such a strategy implausible, including the fact that AT&T has only partial, minority ownership interests in many program services, that AT&T's cable service revenues are likely to decline if it fails to carry rival program services that its subscribers regard as valuable, and that the competitive presence of DBS reduces both the incentive and ability of AT&T to engage in vertical foreclosure.

Finally, by focusing exclusively on competitive concerns, the opposing economists have failed to take into account any of the efficiencies that may result from the AT&T-MediaOne merger. Because these efficiencies are likely to be substantial, the opposing economists have presented a highly distorted picture of the effects the merger can be expected to have.

**Table 1**  
**AT&T-MediaOne Merger**  
**Results of MHHI Analysis**  
**with Respect to the Supply of Video Programming Services**

	Pre-Merger MHHI	Post-Merger MHHI	Delta MHHI <sup>1</sup>
<i>Silent Interest<sup>2</sup></i>			
<i>Post-Merger, MediaOne's interest in Time Warner Entertainment becomes silent</i>			
Case 1: Liberty is a separate entity from AT&T	1934	1981	48
Case 2: Liberty is owned and controlled by AT&T	1940	2045	104
<i>Proportional Control<sup>3</sup></i>			
<i>Post-Merger, MediaOne's interest confers proportional control of Time Warner Entertainment</i>			
Case 3: Liberty is a separate entity from AT&T	1934	1937	4
Case 4: Liberty is owned and controlled by AT&T	1940	2059	118

Notes:

<sup>1</sup>May not equal the difference of the pre-merger and post-merger MHHIs due to rounding.

<sup>2</sup>All other control interests are proportional to ownership interests except in the following cases: Liberty's 9% interest in Time Warner and 8% interest in News Corp. are silent and AT&T's 33% interest in Cablevision is silent.

<sup>3</sup>All ownership interests confer proportional control except the cases noted in footnote 2.

**Table 2**  
**AT&T-MediaOne Merger**  
**Results of MHHI Analysis**  
**with Respect to the Purchase of Video Programming Services<sup>1</sup>**

	Pre-Merger MHHI	Post-Merger MHHI	Delta MHHI <sup>2</sup>
<i>Silent Interest<sup>3</sup></i>			
<i>Post-Merger, MediaOne's interest in Time Warner Entertainment becomes silent</i>			
Case 1: Liberty is a separate entity from AT&T	1051	1304	254
Case 2: Liberty is owned and controlled by AT&T	1069	1328	258
<i>Proportional Control<sup>4</sup></i>			
<i>Post-Merger, MediaOne's interest confers proportional control of Time Warner Entertainment</i>			
Case 3: Liberty is a separate entity from AT&T	1051	1432	381
Case 4: Liberty is owned and controlled by AT&T	1069	1452	383

Notes:

<sup>1</sup>AT&T sells 735,000 subscribers to Comcast post-merger.

<sup>2</sup>May not equal the difference of the pre-merger and post-merger MHHIs due to rounding.

<sup>3</sup>All other control interests are proportional to ownership interests except in the following cases: Liberty's 9% interest in Time Warner is silent and AT&T's 33% interest in Cablevision is silent.

<sup>4</sup>All ownership interests confer proportional control except the cases noted in footnote 3.

## **Appendix A**

### **THE TECHNICAL UNDERPINNINGS OF THE MHHI ANALYSIS<sup>84</sup>**

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<sup>84</sup> This Appendix was written by Daniel P. O'Brien while employed by CRA.



## **Appendix A**

### **The Technical Underpinnings of the MHHI Analysis**

#### **A.1 Introduction**

This appendix provides details on the theoretical underpinnings of the MHHIs and how they are calculated. It presents a model that allows one to calculate the change in concentration under arbitrary assumptions about the degree of influence owners have over the management of firms in which they have an interest. Section A.2 provides the notation used in the model. Section A.3 derives the MHHIs for the case of Cournot oligopoly and explains how they are calculated. Section A.4 explains the relationship between the MHHI and monopsony. Section A.5 gives an intuitive interpretation of how ownership and control affect concentration in the MHHI analysis.

#### **A.2 Notation**

$N$  firms ( $j=1, \dots, N$ )

$M$  owners ( $i=1, \dots, M$ )

$x_j$  = output of firm  $j$ ;

$X = \sum_j x_j$  = industry output (summations are taken over all possible values of the index whenever the domain of the index is omitted)

$s_j = x_j/X$  = firm  $j$ 's market share

$C_j(x_j)$  = cost of output level  $x_j$

$P(X)$  = inverse demand for  $X$

$\pi_j = P(X)x_j - C(x_j)$  = profits of firm  $j$

$\beta_{ij}$  = share of firm  $j$  owned by owner  $i$

$\gamma_{ij}$  = measure of owner  $i$ 's degree of control over firm  $j$

$\eta$  = own price elasticity of demand (absolute value)

$\pi^i = \sum_j \beta_{ij} (x_j P(X) - C_j(x_j))$  = owner  $i$ 's profit

$\Pi_j = \sum_i \gamma_{ij} \pi^i$  = profit maximized by the manager of firm  $j$

### A.3 Analysis

We begin with the derivation of the MHHI as it applies to output markets.

The analog for input markets is presented in subsection A.4.

The manager of firm  $j$  is assumed to maximize a weighted sum of the profits of firm  $j$ 's owners. The idea is that in markets with cross-ownership, the owners generally have conflicting interests regarding the firm's behavior. The assumption here is that owner  $i$ 's influence over manager  $j$  is measured by its "control weight"  $\gamma_{ij}$ .

Thus, the manager of firm  $j$  solves

$$\max_{x_j} \Pi_j = \max_{x_j} \sum_i \gamma_{ij} \pi^i = \max_{x_j} \sum_i \gamma_{ij} \sum_k \beta_{ik} \pi_k = \max_{x_j} \sum_i \gamma_{ij} \sum_k \beta_{ik} [P(X)x_k - C_k(x_k)].$$

The first-order condition for an interior solution is

$$\sum_i \gamma_{ij} \left\{ \sum_k \beta_{ik} P' x_k + \beta_{ij} [P - C_j'(x_j)] \right\} = 0.$$

Multiplying through by  $X/X$  and  $1/P$ , this condition can be rewritten as

$$\sum_i \gamma_{ij} \sum_k \beta_{ik} \left( \frac{P' X}{P} \right) \frac{x_k}{X} + \sum_i \gamma_{ij} \beta_{ij} \frac{P - C_j'(x_j)}{P} = 0,$$

and after rearranging sums, the condition becomes

$$L_j = \frac{P - C_j'(x_j)}{P} = \frac{1}{\eta} \sum_k \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}} s_k.$$

Multiplying both sides by  $s_j$  and summing over all  $j$  yields

$$(1) \quad \sum_j s_j \frac{P - C_j'(x_j)}{P} = \sum_j s_j L_j = \frac{1}{\eta} \left\{ \sum_k \sum_j \left( \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}} \right) s_k s_j \right\}$$

In the standard Cournot model, the bracketed term in (1) would be the Herfindahl-Hirschman index of concentration,  $HHI = \sum_j s_j^2$ . Thus, the HHI can be thought of as a measure of concentration constructed to be proportional to the share-weighted sum of the margins of all firms under Cournot competition. Using the same rule to construct a concentration index for the case of partial cross-ownership, the modified-HHI (MHHI) is the bracketed term in (1):

$$(2) \quad MHHI = \sum_k \sum_j \left( \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}} \right) s_k s_j.$$

By separating out the terms for which  $k=j$ , expression (2) can be written as

$$(3) \quad MHHI = HHI + \sum_j \sum_{k \neq j} \left( \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}} \right) s_k s_j.$$

To carry out the calculations using actual data on market shares and ownership and control parameters, it helps to write expression (2) in matrix form. This gives

$$MHHI = \mathbf{s}' \Phi \mathbf{s}$$

where  $\Phi = \begin{bmatrix} \phi_{11} & \cdots & \phi_{1N} \\ \vdots & \ddots & \vdots \\ \phi_{N1} & \cdots & \phi_{NN} \end{bmatrix}$ ,  $\phi_{kj} = \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}}$ , and  $\mathbf{s} = (s_1, s_2, \dots, s_N)'$ .

#### A.4 The MHHI for Input Markets

The derivation of the MHHI in the previous subsection was based on the assumption that firms compete as Cournot oligopolists in a market for output. Under that assumption, the MHHI is a measure of market power among competing oligopolists. In this subsection we show that the MHHI can also be interpreted as a measure of market power among oligopsonists that purchase inputs in a competitive input market. We consider an industry in which  $N$  firms are monopolists in their own output markets. This discussion assumes that the input price must be the same for each purchaser. Let  $P_j(x_j)$  be the inverse demand for product  $j$  in the final product market, and let  $w(X)$  ( $X = \sum_j x_j$ ) be the inverse supply of an input under constant returns (specifically, 1 unit of the input yields 1 unit of output) by downstream firms to produce the final output. The absolute value of the elasticity of final demand for product  $j$  is  $\eta_j = -1/[(\partial P_j / \partial x_j)(x_j / P_j)]$ , and the elasticity of supply of the input is  $\epsilon^S = 1/[(\partial w / \partial X)(X / w)]$ , where  $w$  is the input price. The profits of downstream firm  $j$  are then  $\pi_j = P_j(x_j)x_j - w(X)x_j$ .

Retaining the rest of the notation introduced in subsection A.1, the manager of firm  $j$  solves

$$\max_{x_j} \Pi_j = \max_{x_j} \sum_i \gamma_{ij} \pi^i = \max_{x_j} \sum_i \gamma_{ij} \sum_k \beta_{ik} \pi_k = \max_{x_j} \sum_i \gamma_{ij} \sum_k \beta_{ik} [P_k(x_k)x_k - w(X)x_k]$$

We will not work through the complete derivation of the MHHI for this case, as it is similar to the derivation for the output market case. Suffice it to say that after taking the first order condition to each manager's profit maximization problem and making the appropriate substitutions, the share-weighted sum of the margins can be written as

$$(4) \quad \sum_j \frac{P_j - w}{w} s_j = \sum_j \frac{1}{\eta_j} \frac{P_j}{w} s_j + \frac{1}{\varepsilon^S} MHHI$$

where

$$MHHI = HHI + \sum_j \sum_{k \neq j} \left( \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}} \right) s_k s_j.$$

The terms under the summation sign on the right-hand side of (4) represents the component of the average margin that arises from the pricing incentives of each firm in its own downstream market.<sup>85</sup> The second term,  $(1/\varepsilon^S)MHHI$ , represents the component of the margin that arises from incentives of the firms in purchasing their inputs. Condition (4) shows that these incentives, like the incentives governing quantity decisions in the Cournot output model, are proportional to the MHHI as it is defined in equation (3). In other words, the same expression for the MHHI holds for measuring the effects of oligopsony in input markets as holds for measuring the incentive effects of oligopoly in output markets.

### A.5 Interpretation of the MHHIs

The MHHI can be rewritten as:

$$MHHI = HHI + \sum_j \sum_{k \neq j} \left( \frac{HHIAF_{jk}}{HHIWF_j} \right) s_k s_j$$

where  $HHIAF_{jk} = \sum_i \gamma_{ij} \beta_{ik}$  measures the “across-firms” concentration arising through owners that have ownership interests in firm k and control interests in firm j, and

<sup>85</sup> To see this, note that a monopolist with a constant input price  $w$  would choose output so that  $(P_j - w)/w = (1/\eta_j)(P_j/w)$ . The summation on the right-hand side of (4) is simply the share-weighted average of these terms across all the output markets.

$HHIWF_j = \sum_i \gamma_{ij} \beta_{ij}$  measures the “within-firm” concentration of the joint ownership and control of firm j. All else equal, the greater is the across-firms concentration from joint ownership of firm k and control of firm j, the greater is the weight placed on the cross-product of the shares of firms j and k in the MHHI calculation. This makes perfect sense; additional joint ownership and control causes managers to internalize more of the adverse effects on cross-owned firms of an expansion in their output. On the other hand, the greater is the within-firm concentration of the ownership and control of firm j, the smaller is the effect of an increase in concentration arising through the joint control of firm j and ownership of firm k. Intuitively, if the within-firm ownership and control of firm j is already highly concentrated, then *additional* control exercised over firm j by owners of firm k has little *additional* influence over firm j's management.

An example will help to clarify these intuitive arguments concerning the role of across-firms and within-firm concentration in determining the MHHI. Suppose that there are two firms, 1 and 2. Initially, firm 1 is wholly owned and controlled by owner A, and firm 2 is wholly owned and controlled by owner B. Suppose that owner A buys an  $\alpha$  share of firm 2. If the investment is a silent financial interest, the across-firms concentration factors are given by

$$HHIAF_{12} = \gamma_{A1}\beta_{A2} + \gamma_{B1}\beta_{B2} = (1)(\alpha) + (0)(1-\alpha) = \alpha,$$

$$HHIAF_{21} = \gamma_{A2}\beta_{A1} + \gamma_{B2}\beta_{B1} = (0)(1) + (1)(0) = 0,$$

and the within-firm concentration factors are

$$HHIWF_1 = \gamma_{A1}\beta_{A1} + \gamma_{B1}\beta_{B1} = (1)(1) + (0)(0) = 1,$$

$$HHIWF_2 = \gamma_{A2}\beta_{A2} + \gamma_{B2}\beta_{B2} = (0)(\alpha) + (1)(1-\alpha) = 1-\alpha.$$

The total weight applied to the cross-product  $s_1 s_2$  in the MHHI calculation is

$$\frac{HHIAF_{12}}{HHIWF_1} + \frac{HHIAF_{21}}{HHIWF_2} = \frac{\alpha}{1} + \frac{0}{1-\alpha} = \alpha.$$

Thus, the change in the MHHI when the owner of firm 1 (owner A) takes a silent financial interest in firm 2 is  $\alpha s_1 s_2$ . This adjustment factor reflects the idea that, after the acquisition, the manager of firm 1 will take into account the effects of its output decision on the profits of firm 2 because the owner of firm 1 (owner A) will have a partial interest in firm 2.

Suppose that instead of being silent owner A's financial interest in firm 2 allows it to exercise proportional control over the manager of firm 2. In this case:

$$HHIAF_{12} = \gamma_{A1}\beta_{A2} + \gamma_{B1}\beta_{B2} = (1)(\alpha) + (0)(1-\alpha) = \alpha$$

$$HHIAF_{21} = \gamma_{A2}\beta_{A1} + \gamma_{B2}\beta_{B1} = (\alpha)(1) + (1-\alpha)(0) = \alpha$$

$$HHIWF_1 = \gamma_{A1}\beta_{A1} + \gamma_{B1}\beta_{B1} = (1)(1) + (0)(0) = 1$$

$$HHIWF_2 = \gamma_{A2}\beta_{A2} + \gamma_{B2}\beta_{B2} = \alpha^2 + (1-\alpha)(1-\alpha),$$

and

$$\frac{HHIAF_{12}}{HHIWF_1} + \frac{HHIAF_{21}}{HHIWF_2} = \frac{\alpha}{1} + \frac{\alpha}{\alpha^2 + (1-\alpha)^2} = 2\alpha \frac{1 - \alpha(1-\alpha)}{1 - 2\alpha(1-\alpha)}.$$

Thus, the increase in the MHHI from a partial investment  $\alpha$  that confers proportional control is

$$2\alpha \frac{1 - \alpha(1-\alpha)}{1 - 2\alpha(1-\alpha)} s_1 s_2.$$

Note that the increase in the MHHI is greater when the investment confers proportional control than when the investment is a silent interest.